

## Aquatic Microbial Community Management (I002086)

**Course size** *(nominal values; actual values may depend on programme)*

**Credits 3.0** **Study time 75 h**

**Course offerings and teaching methods in academic year 2023-2024**

A (semester 1) English Gent lecture

**Lecturers in academic year 2023-2024**

Defoirdt, Tom LA25 lecturer-in-charge

**Offered in the following programmes in 2023-2024**

	<b>crdts</b>	<b>offering</b>
<a href="#">International Master of Science in Health Management in Aquaculture</a>	3	A
<a href="#">International Master of Science in Marine Biological Resources</a>	3	A
<a href="#">Master of Science in Aquaculture</a>	3	A
<a href="#">Exchange Programme in Bioscience Engineering: Agricultural Sciences (master's level)</a>	3	A

**Teaching languages**

English

**Keywords**

Micro-organisms, communities, microbiota, recirculating aquaculture systems, functionality, ecological selection, bio-floc technology.

**Position of the course**

The purpose of this course is to familiarize the students with the importance of the micro-organisms that are present in (the different compartments of) aquaculture systems, and how these can be managed. The students will learn that by the targeted manipulation of the microbiota in aquaculture systems, the disease risk for the cultured animals can considerably be decreased and production output can be increased. At the end of this course, it is the goal that the student can assess if an aquaculture system is managed in a microbially proper way, and how this can be remedied if this should not be the case.

**Contents**

- 1 Intro: the presence of micro-organisms in aquaculture systems
  - 1 Concepts, origin and prevalence
  - 2 Microbial biomass vs. target biomass
  - 3 Bacteria as food
  - 4 Commensal bacteria vs. pathogenic bacteria
- 2 Traditional management of the microbiota in aquaculture systems: antibiotics, hygienic barriers, SPF animals
- 3 Sustainable management of the microbiota in aquaculture systems:
  - 1 Probiotics and prebiotics
  - 2 Quorum sensing inhibition and quenching
  - 3 r/K selection
    - 1 flow-through
    - 2 matured biofilters
    - 3 recirculating aquaculture systems
  - 4 Bio-floc technology
    - 1 Concept
    - 2 Basics of biofloc management
    - 3 Beneficial effects on cultured animals
- 4 Managing the microbiota towards functionality
  - 1 Management of the microbiota based on ecological theory
  - 2 Management of the microbiota towards biodiversity increase

- 5 Tracking of micro-organisms in aquaculture systems
  - 1 Tools: Plating, flow cytometry, DGGE, t-RFPL, next generation sequencing
  - 2 Interpretation of microbial community composition data

### **Initial competences**

General biology, chemistry, biochemistry and basic knowledge on aquaculture.

### **Final competences**

- 1 The student is aware of the significance of the natural microbiota in aquaculture systems.
- 2 The student is able to describe and discuss the microbial compartments in aquaculture systems.
- 3 The student knows the methods that are available to evaluate the microbial community composition.
- 4 The student is able to assess if the microbial status in the aquaculture system poses a potential danger for the cultured animals or not.
- 5 The student is able to make funded suggestions and recommendations to improve the microbial community composition and functionality with the aim of maximizing animal health and culture performance.

### **Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

### **Teaching methods**

Lecture

### **Extra information on the teaching methods**

Theory lectures: lectures based on powerpoint presentations.

### **Learning materials and price**

Outprints of the powerpoint presentations will be available during all classes.

Estimated cost of the print-outs: 15 euro (included in fee that is paid in the beginning of the academic year).

### **References**

### **Course content-related study coaching**

Study guidance upon request by email or on appointment.

### **Assessment moments**

end-of-term assessment

### **Examination methods in case of periodic assessment during the first examination period**

Written assessment

### **Examination methods in case of periodic assessment during the second examination period**

Written assessment

### **Examination methods in case of permanent assessment**

### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible

### **Extra information on the examination methods**

Period aligned evaluation: theory: written closed book exam.

### **Calculation of the examination mark**

Out of 20:

20 points attributed to closed book written exam

Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examiner.

